

Case Study 1

Description of property

Stone built in remote mountain location. Freehold. Access by single track road and track. Parking area at hut.



Facilities	30 beds in 4x rooms. Lounge. Kitchen/dining room seating for 18. Shower room. M/F toilets. Outside shed/wood store.
Utilities	Mains electricity. Stream water UV treated.
Hot water	Solid fuel Rayburn. Immersion heater on 2 hour timer. Wall kettle in kitchen.
Heating	Solid fuel Rayburn in kitchen (anthracite) – HW and radiators. Open fire (wood) in lounge.
Cooker	LPG gas
Lighting	Electric
Occupancy	12% 1324 bed nights (Approx. 50% members). 142 days (72 at weekends)
Charges (per person/night)	Members £5; non-members £9.
Annual energy costs	Electricity £456 Wood £200 Anthracite £540 LPG £76 (?)
Notes	Hut used mostly in Autumn, less in summer. Hut is warm but does take 2 days to heat up in cold weather.

Recommendations resulting from discussions in workshops.

The first priority should be to check that insulation levels are adequate (e.g. windows and loft). Also replace all lighting with LEDs if this hasn't already been done.

Most of the electricity costs appear to be for the immersion heater. The Rayburn generally did not find favour. Despite being relatively economical when used with solid fuel, it will not provide 'on demand' heat and hot water, resulting in an over reliance on very expensive electricity. For central heating and hot water two solutions were proposed:

- Oil fired central heating could be installed for less than £2000 (assuming existing radiators and pipe work are used). This could pay for itself within 5 years.
- More ambitiously, a bio-mass/pellet stove boiler could be installed (e.g. <http://tinyurl.com/phkod5e>). The initial cost for this would be significantly higher but there are very generous subsidies available through the Renewable Heat Incentive (<http://tinyurl.com/p2o5gpr>). Assuming the property is mortgage free it would be a relatively straightforward matter to raise the capital at currently very favourable interest rates.

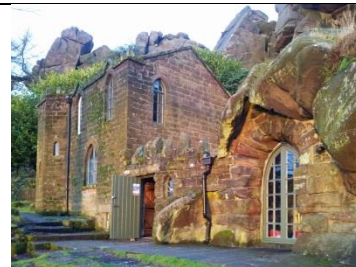
If planning permission allowed, there appears to be sufficient space for at least a 2kW PV installation on the S facing roof. This would provide the bonus of providing income through a feed in tariff when the hut is not occupied.

A modern log burner would be more efficient than an open fire but would need more maintenance. It is not recommended where the hut is used by 'outsiders' as it requires a degree of familiarity and skill to use.

Case Study 2

Description of property

Stone built Grade II listed. Leased from National Park. Access by track and footpath (approx. 500ms from parking area).



Facilities	12 beds in 2x rooms. Kitchen/dining room seating for 12. Washroom. Lounge. No outside storage.
Utilities	Mains electricity. Mains water.
Hot water	15L vented point of use electric in kitchen and washroom.
Heating	Night storage radiators (6). 2kW electric convector heater in lounge on variable timer (5-20 minutes). Dehumidifiers in kitchen and stairwell.
Cooker	Electric halogen hob/oven.
Lighting	Electric
Occupancy	26% of max bed nights per year. 1200 bed nights. Approx. 150 days per year mostly (95) at weekends.
Charges (per person/night)	£8 inc Vat. (increased to £10 in 2014).
Annual energy costs	Economy 7 – approx. £2000 (14450kWh)
Notes	Kitchen area (cave) very cold and damp. Open fireplaces in lounge and kitchen have been blocked off during conversion in 1990s.

Recommendations

The case study is basically the situation at the DWMH pre-2013. The scope for major changes are clearly limited by the problems of access and the listed status (no scope for PV electrics, limited options for improving insulation, etc.) In view of the limited storage available a log burner and/or biomass heating boiler are also ruled out.

The main focus should be reducing in electricity costs. The older storage radiators would be very inefficient and wasteful, particularly at occupancy rates of only about one third days per year. With higher occupancy more sophisticated heaters could be considered (<http://www.fischerfutureheat.com/>) but the Economy 7 package is no longer considered competitive, particularly at over 20p per unit when using energy at peak times (e.g. for cooking and the fire in the lounge).

The solution proposed for the main hut was to replace the storage radiators with oil filled panel electric heaters and pay particular attention to controls through timers and thermostats. This is actually what was done in 2013. The heating system is now controlled by a master switch, on only when the hut is occupied. A timer delivers heat in the morning and evening. The consequent reduction in energy costs had been impressive (14,450 kWh/year down to 8,921 kWh), effectively halving the annual cost. The total cost of the work of (£2,250) should therefore be repaid in just over 2 years. Monitoring internal temperature levels (by using a simple weather station) has shown that the convector heater in the lounge was no longer necessary and this has been removed.

For those familiar with the kitchen (basically a cave!) it was clear that the small-scale dehumidifiers would have little impact other than increasing the electricity bill. Various high tech options were considered. However the actual solution adopted at the hut – installation of 4 low glare 2Kw patio heaters (<http://tinyurl.com/k7zcfth>), controlled by 15 minute on-demand timers – had resulted in a notable improvement in comfort levels for an investment of around £2000.